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ABSTRACT

The history and institutional use of cutoff scores is reviewed, emphasizing the changes in these scores used over the years and the rationale used in selecting cutoff scores. A brief description of the College Level Examination Program (CLEP) is provided, as is background about how it works. Cutoff score recommendations of the American Council on Education, and its recommendations concerning the use of CLEP examinations are fully described. Many of the observations presented on the methods used by institutions and on changes in institutional approach are somewhat subjective. Because most institutions base their cutoff score decisions on data published by the College Board and on recommendations of the American Council on Education, this information is described in detail. Changes that have occurred in these published interpretative data and cutoff score recommendations are also discussed. Trends that appear to be occurring in the setting of cutoff scores are also discussed. (Author/GK)

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INSTITUTIONAL USE OF CUTOFF SCORES FOR THE COLLEGE-LEVEL EXAMINATION PROGRAM

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by

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Educational Testing Service

TM 810216

Paper presented as part of a symposium on "Current Policies, Institutional Impact, and Evaluation of Cutoff Scores" at the Annual Meeting of the National Council of Measurement in Education, Los Angeles, April 13-17, 1981.

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INSTITUTIONAL USE OF CUTOFF SCORES FOR THE COLLEGE-LEVEL EXAMINATION PROGRAM

Jane F. Flaherty
Educational Testing Service

Introduction

The College-Level Examination Program of the College Board began operation in 1967 with eighteen examinations of college-level learning. The tests were to be used by colleges and universities to award credit to students or exempt them from certain course requirements. Each institution was free to use whichever CLEP examinations it considered reflective of its own curriculum, and to use whatever cutoff scores it deemed appropriate for granting credit or exemption on the basis of these tests. The purpose of this paper is to review the history of institutional use of cutoff scores, observing the changes in cutoff scores used over the years and the rationales used in selecting cutoff scores.

Available data related to this subject are somewhat limited. A College Board publication, College Placement and Credit by Examination, reported the cutoff score for each CLEP test used by institutions responding to a 1975 survey, but no summary data or analysis was included, nor did it provide information on the rationales for using the cutoff scores.[1] The 1978 edition[2] of this publication reports some summary data, but the changed format of the book makes it cumbersome to compare institutional cutoff scores with those reported in 1975. A national survey of institutions was also conducted in 1975[3] to ascertain the manner in which they were using the General Examinations, and

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[1] College Entrance Examination Board, College Placement and Credit by Examination, 1975 (New York: CEEB, 1975).

[2] Idem, College Placement and Credit by Examination: 1978 Guide to Institutional Policies (New York: CEEB, 1978).

[3] Jerilee Grandy and Walter Shea, The CLEP General Examinations in American Colleges and Universities (New York: CEEB, 1976).

provided some useful data for this paper, as did an earlier unpublished survey of Missouri institutions in 1971.[1] Relatively few institutions have prepared reports detailing their methods or rationales for setting cutoff scores for CLEP, and it is unknown how many have conducted informal studies and not prepared reports.

Because of the scarcity of hard data, many of the observations presented in this paper on the methods used by institutions and on changes in institutional approach over the years are somewhat subjective. They are based to some extent on information gleaned from my own day-to-day contact with institutions, with College Board CLEP representatives, and with ETS staff and others who have gained knowledge through experience over the years. Because most institutions base their cutoff score decisions on data published by the College Board, and on recommendations made by the American Council on Education and other organizations, this information is described here in some detail, and the changes that have occurred in these published interpretive data and cutoff score recommendations are also discussed. This information will be followed by a discussion of how institutions seem to have used these data over the years, and the trends that appear to be occurring in the setting of institutional cutoff scores.

The CLEP Program

A brief description of the program and how it operates is given here to provide background for those not familiar with CLEP. The program today consists of five General Examinations and 47 Subject Examinations. The General Examinations were the first to be developed, and grew out of the college-level General

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[1] Margaret Fagin, "Report of Institutional Policies of Missouri Colleges and Universities Relative to Granting and Recording of College Credit Based on the College Level Examination Program Tests" (University of Missouri-St. Louis, Extension Division, January 1971).

Education Development (GED) tests of the American Council on Education (ACE) and the Comprehensive College Testing Program of the Educational Testing Service (ETS). The tests were first administered under the College-Level Examination Program of the College Board in 1967.

Initially, the five tests were used as a battery, allowing students to begin college at the sophomore level. Today, most institutions use the tests individually to allow students to fulfill distribution requirements in five liberal arts or general education areas: composition, natural sciences, social sciences and history, humanities, and mathematics. There have been some changes in the General Examinations over the years, but they have remained the same conceptually. Rather than reflecting the content of specific college courses, as do the Subject Examinations, the General Examinations cover material generally considered to be fundamental to a college education. While liberal arts requirements may vary from one college to another, as may the courses individual students take to fulfill the requirements of their colleges, the General Examinations attempt to sample the core of knowledge generally considered a part of these varied courses at most institutions. The general nature of these examinations has made it difficult to establish suitable national norms, a subject that will be addressed later in this paper. Scores on the examinations are reported as scaled scores which range from 200 to 800 with a mean of 500 and a standard deviation of 100 based on the performance of college students assumed to have fulfilled their own institution's liberal arts requirements. Subscores for four of the examinations are reported on a scale of 20 to 80 with a mean of 50 and a standard deviation of 10.

Each Subject Examination is based on the material taught in a specific college course at a variety of colleges and universities. Among the 47 currently-

offered Subject Examinations are several tests in each of the following areas: composition and literature, modern languages, natural sciences, mathematics, social sciences and history, education, business, nursing, medical technology, and dental auxiliary education. Reference data are based on performance of students completing a course which corresponds to the particular test title. Scores are reported on a scale of 20 to 80 with a mean of 50 and standard deviation of 10. Only a few of the Subject Examinations have subscores, and these are also reported on 20-to-80 scales. In addition to the multiple-choice tests scored at ETS, there are optional essay tests for most Subject Examinations. These essays may be taken by candidates at no extra charge if they are required by the college they are attending. A candidate's essay is sent to his or her institution with the multiple-choice score report for grading by faculty.

CLEP examinations are administered at some 900 test centers located at colleges and universities across the country. Candidates may request that their scores be sent to the institution of their choice. It is the candidate's institution that evaluates the test results and decides whether or not to grant credit or exemption. For this reason, candidates are advised to contact the institution they attend, or plan to attend, prior to taking a test to find out which tests the institution accepts and what score is required to earn credit or exemption.

Published Interpretive Data

To assist institutions in determining suitable cutoff scores, the College Board publishes interpretive data based on the performance of college students who have completed coursework in the subject area of each CLEP test. The program has always been dependent upon the willingness of institutions to participate in these studies, and does not claim to include a representative

group of students or institutions in its samples--although it makes every effort to do so. Over the years, it has become increasingly difficult to elicit acceptable rates of participation, and the representativeness of the participating institutions has at times been questionable. About three years ago, it was suggested by ETS measurement specialists that the term "norms" be replaced by the generic term "reference data" to avoid the implication that the samples were representative of institutions across the country. The history of the General Examinations which follows is an example of the problem of obtaining suitable samples for scaling CLEP examinations and establishing reference data.

The General Examinations

The scale and reference data for the initial versions of the CLEP General Examinations were established in 1963. About 250 institutions selected to be representative of colleges and universities in the United States were invited to participate by testing 16 students selected randomly from their full-time sophomore class, and the 180 institutions that finally participated were considered to be representative of American institutions. Similarly, reference data based on the performance of freshmen in 1964 and seniors in 1966 were compiled. The three sets of reference data were published in the College Board's first CLEP Score Interpretation Guide[1] in 1967. Not only were percentiles reported for the total groups, but separate percentiles for men and women were also included. Copies of these tables may be found in Appendix A.

In its next interpretive guide, CLEP Scores: Interpretation and Use, published in 1973, the College Board discontinued the reporting of the freshman and senior norms. The 1963 "sex norms" were included in the 1973 and 1976 inter-

[1]Educational Testing Service, Score Interpretation Guide (New York: College Entrance Examination Board, 1967), pp. 7-14.

pretive guides, but dropped thereafter. When the General Examination in Mathematics was revised and rescaled in 1972, however, separate percentile ranks for men and women were not reported (see Appendix B). The 1967, 1973, and 1976 editions of the interpretive guide reported percentiles for every 20th point on the 200 to 800 scale, and specified the scaled scores corresponding to the 25th, 50th, and 75th percentiles. Percentile tables for the examinations that had subscores were also included (see Appendix A).

In 1978, all of the General Examinations were lengthened from 60 minutes to 90 minutes. The English Composition test was changed substantially, while the content of the other four examinations remained basically the same. Because of the revision, the English Composition test was rescaled, while scores on the new versions of the others were equated (made comparable) to their respective 1963 scales for Humanities, Social Sciences and History, and Natural Sciences, and the 1972 scale for Mathematics. In response to criticism about the make-up of the 1963 and 1972 reference groups, new reference data were established--this time based on the performance of students, primarily freshmen, completing courses in the area in which they were tested. This time, of a total of more than 400 institutional departments invited to participate, only about one-fourth (115) actually participated, as compared with nearly a 75 percent participation rate in 1963.

Comparison of the performance of the 1963 (1972 for Mathematics) and 1978 groups also proved disappointing. On each of the four equated tests, the 1978 students scored some 40 points lower, on the average, than did the earlier student groups. Review and discussion of the studies and the data by staff at ETS and the College Board led to the conclusion that the difference in performance was due primarily to the obvious difference in composition of the samples. It

was decided that both sets of data should be reported to institutions along with an explanation of the differences between the 1963 (1972) and 1978 sampling procedures. Institutions were advised that they could continue to use the earlier reference data, and that they could, if they wished, continue to apply their existing cutoff scores for the four equated tests. They were, however, given the option of using either set of data as a basis for determining their cutoff scores. In addition, data on the performance of candidates were provided and a table comparing the performance of the two student samples with that of 1977-78 candidates was included. In response to requests from institutions a table showing the range of correct answers needed to earn selected scaled scores on each test was provided as well.[1] Copies of the tables included in this report, a supplement to the 1976 edition of score interpretation guide, may be found in Appendix C.

Because the 1978 version of the English Composition test was rescaled, the 1963 reference data were no longer applicable. From the performance of the 1978 students, it was apparent that a given score on the new test represented somewhat lower achievement than the same score on the old test. But there were no common items linking the old and new tests, making it impossible to determine how different the two scales were.

After monitoring the scores of candidates for several months, ETS staff observed that candidates taking the 90-minute test in 1978-79 were earning scaled scores a hundred or more points higher, on the average, than did candidates who took the 60-minute test during 1977-78--even though the general characteristics of the candidates did not change significantly. Institutions

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[1] [Educational Testing Service] Supplementary Information to CLEP Scores: Interpretation and Use for the 90-Minute General Examinations (New York: College Entrance Examination Board, 1979), p. 5.

with cutoff scores of 500 for the 60-minute test had awarded credit to an average of about 37 percent of the candidates submitting scores on that test; but if they used the same cut-point for the new test, they were finding themselves awarding credit to an average of 79 percent of candidates submitting scores--a substantial difference.

Based on these data, the College Board and ETS issued a joint memorandum[1] to institutions advising them that, assuming that they had found their cutoff scores for the old test satisfactory, and wanted to give credit to students at comparable achievement levels, they should add 100-110 points to the old cutoff score to accomplish this. Thus, there was a departure from the practice of using percentile ranks to establish cutoff scores, although the cutoff scores derived by the new suggested procedure were linked to percentile ranks on the earlier test.

In 1981, a new expanded score interpretation guide was published.[2] It reported interpretative data for all versions of all the General Examinations from 1963 to the present, but in more detail than before. Percentile ranks were reported for every 10th point on the General Examination scales between 400 and 600 (see page 12), the range in which most institutional cutoff scores fall. The table of percentile ranks for recent candidates was abbreviated from the earlier 1976 supplement to show only the mean and standard deviation of candidate scores on each test (see page 38). A table showing the scaled score corresponding to every 5th percentile from 25 to 75 replaced the reporting of only the 25th, 50th, and 75th percentiles (see page 35) and the range of right answers required

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[1] The full text of this memorandum may be found in the attached copy of CLEP Scores: Interpretation and Use, 1980-81, pages 40-42.

[2] Educational Testing Service, CLEP Scores: Interpretation and Use, 1980-81 (New York: College Entrance Examination Board, 1981). A copy of this publication is attached.

for selected cutoff scores was reported as well (see page 37). An explanation of the 1978 reference data and how they compare with the earlier reference data were provided (see page 11), along with the full text of the English Composition advisory memorandum (pages 40-42). No mention was made of the sex norms reported in earlier publications, nor to the freshman and senior norms provided in the first CLEP score interpretation guide.

The Subject Examinations

The interpretive data provided for the Subject Examinations has been somewhat different from those discussed for the General Examinations. In addition to percentile ranks based on students completing courses in each of the thirteen original Subject Examinations,[1] the first CLEP interpretive guide included graphic presentations of the score distributions for students earning As, Bs, Cs, Ds, and Es (failing) as final course grades.[2] The graph showed the 10th, 25th, 50th, 75th, and 90th percentiles for the overall group, as well as for students earning each course grade. Below the graph, the mean test score of the total group and for students earning each course grade was given. An example of one of these graphs and of the percentile table is provided in Appendix D.

In subsequent editions of the score interpretation guide, the graphic presentations were dropped, but the mean scaled score earned by A, B, C, D, and E students continued to be reported in table form (see Appendix D and page 19 of the attached CLEP Scores, 1980-81). The most recent guide also includes expanded percentile tables, showing point-by-point percentiles for scores from 40 to 60, rather than for only every 5th point on the scale as in previous guides. As for

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[1] Score Interpretation Guide (1976), p. 15.

[2] Ibid., pp. 16-28.

the General Examinations, scaled scores corresponding to every 5th percentile from the 25th to the 75th (page 35), ranges of correct answers required to earn selected scaled scores (page 37), the mean scores of 1978-79 candidates (page 38), are reported.

Faculty Panels

As plans were being made for the collection of new reference data for the General Examinations in 1978, the idea of arranging for panels of college faculty to review the tests was also considered. The frequent inquiry from faculty involved in recommending and reviewing institutional policy was "How much does a student have to know to pass the test at a given score, and how many questions must be answered correctly to earn that score?" In addition to providing the table showing the range of right answers needed to earn selected scores, the need for a content analysis of the General Examinations by subject matter specialists was recognized. Plans were made to follow the 1978 study with "faculty panel" reviews which were to culminate in recommendations for appropriate use of the tests, including suggested cutoff scores from the faculty viewpoint.

Pilot Panel

The first group to meet was the Natural Sciences panel. This was a pilot faculty panel, the purpose of which was to try out various judgmental methods of setting cutoff scores and to explore the feasibility of convening faculty panels for the five General Examinations. Four panel members who had taken the tests themselves prior to the meeting were guided in the application of the Angoff and Nedelsky methods of estimating the number of questions that would be answered right by their own minimally competent students. A decision theory approach was

then tried in which distributions of test scores by final course grades earned by students in the 1978 reference group were used. From these data, the panelists were asked to independently select a point at which a minimum of students with low course grades would get credit and a minimum of students with high course grades would be denied credit--"minimum" in each case to be defined by the panel's own judgments. After a discussion of institutional use of cutoff scores, recommendations made by ACE and other external groups, and the experience of using the judgmental procedures, the pilot panel made recommendations for the function of future faculty panels and the procedures they should use. They recommended that future faculty panels take the test prior to the meeting, use the Angoff but not the Nedelsky judgmental method, engage in the test score/course grade decision theory activities, examine all available data on reference group and candidate performance, and receive background information on current use and misuse of the tests. They suggested that the panels should establish guidelines that include:

- The maximum number of credits to be awarded
- An appropriate range of cutoff scores together with a description of how the range was established
- Suggested procedures for institutions to follow to establish their own cutoff scores, including faculty involvement and local standard-setting administrations
- A description of appropriate uses and misuses of the examination
- In the case of Natural Sciences, a discussion of the laboratory component of science courses in relation to awarding credit using the examination.

It was expected that a future meeting of an operational faculty panel for Natural Sciences would develop the actual recommendations for use by institutions.

English Composition Panel

Because of interpretive problems resulting from the rescaling of the

English Composition examination in 1978, which have been described above, the Faculty Panel for English Composition was the first operational panel to be scheduled. The procedures used by this panel followed the recommendations of the pilot panel; however they were more complex because of the existence of a holistically-scored essay as part of one version of the English Composition test.

The process did not go as smoothly as was hoped for a variety of reasons, but primarily because the panel was expected to absorb and accomplish too much in too short a time. The five English professors, none of whom had been involved in the development of the test and who were unfamiliar with statistical aspects of standardized testing, were unable to process all the new information presented to them in two-and-a-half days. Thus, the information presented early in the meeting when the panel members were fresh and alert, was given more weight in the derivation of recommended cutoff scores than information presented later. Also, there was some evidence of the general tendency of faculty to overestimate the ability of their students, and the resulting judgmental data were, in this instance, given more weight than the performance data of the students in the 1978 reference group.

Nonetheless, a useful statement was prepared as a result of the panel, which included a discussion of appropriate uses and misuses of the test and considerations for developing policies, as well as a recommendation that institutional cutoff scores be set within the range of 560 to 630. This range is somewhat higher than ACE's recommended range of 530 to 610, and it corresponds to the 30th to 60th percentile, approximately, of the 1963 sophomore norms, and to the 70th to 90th percentile of the 1978 reference group. The statement of the panel has been widely distributed to institutions, and a summary is included

in the 1981 edition of CLEP Scores: Interpretation and Use (see attached copy, pages 46-47). A more detailed description of both panels may be found in a paper presented as part of the cutoff score symposium last year.[1]

Because of the procedural difficulties encountered in conducting the English Composition panel, plans for additional faculty panels were tabled. The possibility of involving the test development committees, which are also comprised of about five faculty members, in making recommendations for cutoff scores and appropriate use of their tests is being discussed. This plan has the advantage of using faculty who have gained some training and experience with measurement issues and statistical concepts, and have developed skill in writing and evaluating test items through their committee involvement. In the next few years, the CLEP program is likely to use at least some components of the faculty panel idea to provide guidance to institutions in the use of its tests.

Cutoff Score Recommendations of the American Council on Education

The recommendations for use of the CLEP examinations by the American Council on Education grew out of its historical interest in the examinations. The ACE recommendations are widely distributed to institutions, and are included in CLEP publications of the College Board to supplement the interpretive data published by the program. (See the attached CLEP Scores, 1980-81, pages 43-44.)

The General Examinations

The first ACE recommendation for the General Examinations was adopted in 1964, shortly after the compilation of the 1963 sophomore norms. It suggested that for each test institutions grant six hours of baccalaureate credit, or the

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[1] Walter M. Shea, "Selection of Cutting Scores: The CLEP Experience," paper presented at the annual meeting of NCME, Boston, April 1980.

amount of credit they normally granted in the areas covered by the tests, for a score at or above the 25th percentile of the 1963 sophomore norms. It was felt at the time that, assuming all students in the reference group had fulfilled their college's requirements in the five areas, those scoring above this level had demonstrated the equivalency of required courses in these areas.

Twelve years later, in 1976, based on the results of a survey conducted by ETS for the College Board under ACE's supervision, ACE extended its recommendation to reflect the actual practice of institutions in setting cutoff scores. The survey found institutional cutoff scores ranged from as high as 600 (about the 85th percentile) to below 400 (the 15th-20th percentile). More than half were using cutoff scores at or near the 50th percentile, while only about one in six were using cutoffs at or near the 25th percentile. About 90 percent of all cutoff scores fell in the scaled score range of 421 to 500, or approximately the 25th to the 54th percentile of the 1963 sophomore norms (1972 for Mathematics). On this basis, ACE changed its recommendation to suggest that "colleges and universities award credit on the basis of minimum scores at a specific point not lower than a scale score of 421 nor higher than a scale score of 500 (approximately the 25th to 54th percentile of the 1963 sophomore norms)--the range which experienced users of the General Examinations have found appropriate as indicated in the [table on the next page].[1]

Following the collection of reference data for the 90-minute examinations in 1978, ACE's Commission on Educational Credit and Credentials reviewed the results of the study. It decided to retain its 1976 cutoff score recommendation for the four equated tests, i.e., it suggested that credit be awarded on the

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[1] "American Council on Education, Commission on Educational Credit and Credentials, Recommendations Concerning Use of College-Level Examination Program (CLEP) Examinations," in Educational Testing Service, CLEP Scores: Interpretation and Use (New York: College Entrance Examination Board, 1976), p. 43.

Frequency Distributions of Cutting Scores by Institutions Using the General Examinations*

	English Composition		Mathematics		Humanities		Natural Sciences		Social Sciences and History	
Score Intervals	No.	%	No.	%	No.	%	No.	%	No.	%
581-600	1	.3%	4	1%	2	.6%	2	.7%	1	.3%
561-580	4	1%	2	.6%	3	1%	3	1%	5	2%
541-560	7	2%	7	2%	8	3%	8	3%	5	2%
521-540	8	2%	6	2%	3	1%	4	1%	4	1%
501-520	7	2%	6	2%	5	2%	4	1%	5	2%
481-500	208	58%	191	57%	177	56%	177	58%	180	56%
461-480	30	8%	19	6%	31	10%	23	8%	30	9%
441-460	31	9%	35	11%	29	9%	26	9%	28	9%
421-440	49	14%	30	9%	50	16%	52	17%	49	15%
401-420	5	1%	27	8%	3	1%	3	1%	6	2%
Less than 401	7	2%	6	2%	6	2%	5	2%	6	2%

*Jerilee Grandy and Walter M. Shea, The CLEP General Examinations in American Colleges and Universities (New York: College Entrance Examination Board, 1976), p. 11.

basis of minimum scores within the scaled score range of 421 to 500. Based on the information presented in the English Composition advisory memorandum to institutions, which suggested that adding 100-110 points to a cutoff score based on the 1963 sophomore norms would maintain a policy equivalent to a policy on the old test, the Council decided to raise its previous recommended range by 110 points. The resulting recommendation stated that cutoff scores for the 90-minute English Composition test should fall within the scaled score range of 530-610. The Council further decided to delete all reference to percentiles in its recommendations so as to avoid confusion between the two sets of available reference data for the General Examinations. The full text of the 1979 recommendations may be found on page 43 of the attached CLEP Scores, 1980-81.

The Subject Examinations

ACE's original cutoff score recommendation for the Subject Examinations was the same as for the General Examinations - the 25th percentile. In 1971, the Council on College-Level Examinations of the College Board recommended that credit should be awarded for scores at or above the mean score of C students in the national norming groups.[1] In 1972, ACE followed suit, and changed its 25th percentile recommendation for the Subject Examinations to the "mean C." The currently worded recommendation of ACE's Commission on Educational Credit and Credentials states that "the minimum score required for credit for CLEP Subject Examinations be the average score of students in the norming groups who earned a grade of C in a comparable college course."[2] It provided a table showing the "mean C" score for each Subject Examination and the number of semesters for which the examination was designed. The most recent table may be found on page 44 of CLEP Scores, 1980-81. The rationale for the "mean C" cutoff score recommendation is based on the theory that credit by examination should not be granted below the C level--the satisfactory passing level for courses at most institutions, and the level at which course credit is generally transferred from one institution to another.

Recommendations for Use of Local Data for Setting Cutoff Scores

So far, no mention has been made of what might be considered the most important recommendation made in CLEP publications and ACE recommendations dating back to the earliest--that of establishing cutoff scores based on local

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[1] Letter to institutions from Dewey B. Suit, Chairman, Council on College-Level Examinations, in Educational Testing Service, CLEP Scores: Interpretation and Use (New York: College Entrance Examination Board, 1973), p. 41.

[2] CLEP Scores, 1980-81, p. 43.

standard-setting administrations and local institutional experience with a given CLEP policy.

College Board Recommendations

The first CLEP Score Interpretation Guide, published by the College Board in 1967, pointed out that while national norms may be easier to use, norms based on performance of students from a variety of institutions have their limitations. It advised that,

> what is true for groups of colleges is not necessarily adequate for each individual institution where curriculum and students may differ in crucial ways from those in the national norms group. Thus, in making decisions about awarding credit, colleges should, whenever possible, develop local norms for the tests with their own students and courses.[1]

The guide suggested further that,

> (local) norms have the advantage of homogeneity, since the students included in the norms all come from the same educational setting. Moreover, they constitute a group with which the test user has first-hand knowledge and familarity. Further homogeneity may be effected by separating the total group into finer subgroups that differ from one another in important and relevant respects. Local norms are especially valuable when they are collected in a way that will help one to make better decisions in individual situations.[2]

In this and later publications, the College Board offered to provide free trial administrations of CLEP examinations to institutions interested in developing local norms.[3]

In 1977, the College Board developed a statement, addressed to all users of College Board tests and related data. It described "how the College Board, as the sponsor of test services, interprets its own responsibilities in relation to the public and its clientele of test users, what additional responsibilites it

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[1] Score Interpretation Guide (1967), p. 15.

[2] Ibid., p. 7.

[3] Ibid., p. 7.

believes the users of these services have, and what conditions are appropriate for the several uses of College Board tests."[1] The following admonitions were made regarding the use of College Board tests for placement and credit purposes. Institutions should:

> Develop their practices, policies, and procedures in the light of the performance levels and ranges of enrolled students.
>
> Require faculty members who may be responsible in the particular subject-matter areas covered by the tests to review the examinations to be used for appropriateness.
>
> Establish levels of performance on examinations for which credit is granted that are not significantly higher or lower for those seeking credit than for those who do successful work in the relevant courses.[2]

In its most recent score interpretation guide, the College Board provides a set of steps that institutions may take to establish or review a CLEP policy. It suggests that they:

1. Define student, institutional, and/or departmental credit-by-examination needs.
2. Form groups of faculty members and administrators to review the examinations and make policy decisions.
3. Conduct local standard-setting administrations.
4. Review local and national reference data, and recommendations of ACE and other groups.
5. If there is an existing policy, review institutional experience with that policy by evaluating the performance in subsequent course work of students who were awarded and denied credit or exemption, and identifying the number of false-positive and false-negative decision errors.
6. Arrive at cutoff scores or score ranges based on all of the above information.
7. Decide whether conditions in addition to earning a specified CLEP score will be required, such as satisfactory performance on the optional essay tests offered with most CLEP Subject Examinations or demonstration of laboratory skills for science courses.

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[1] "Guidelines on the Uses of College Board Test Scores and Related Data," in CLEP Scores 1980-81, pp. 50-51.

[2] Ibid., p. 51.

8. Develop a policy statement to be published in the institution's catalog that specifies the examination titles for which credit or exemption may be earned, the minimum passing score and the number of credits that may be earned for each, and additional requirements or conditions for earning credit.

9. Periodically review the institutional policy to make sure it is working well and is consistent with current curriculum and student performance.[1]

In addition to information and advice given through its publications, the College Board has established regional offices, each with a CLEP representative to assist institutions in developing their policies. The Board has offered numerous workshops and published materials to assist institutions in setting cutoff scores.[2] Thus, the College Board has given due emphasis to the importance of using local data and experience in setting cutoff scores and developing CLEP policies.

ACE Recommendations

The American Council on Education, too, as part of its recommendations concerning the use of CLEP examinations, has encouraged institutions to administer the tests to their own students and establish minimum scores consistent with the standards of the institution. Among its recommendations for the use of CLEP examinations, are the following:

> That whenever practical, decisions regarding minimum scores for the awarding of credit be based on appropriate institutional studies; such studies are especially recommended if the selected minimum scores fall outside the [recommended] ranges,...
>
> That whenever institutional data are not available [emphasis added], colleges and universitites award credit on the basis of [the specified] minimum scores,...
>
> That institutional policies be regularly reviewed on the basis of

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[1] CLEP Scores, 1980-81, pp. 18-21

[2] Examples of College Board publications on this subject and materials distributed at College Board workshops are included in the Bibliography.

> follow-up studies conducted on students who have earned credit through the...Examinations.[1]

Other Recommendations

In addition to the recommendations of the College Board and the American Council on Education, two other professional associations have made recommendations that address the issue of setting cutoff scores. The Mathematical Association of America, in a joint statement with the College Board, asserted that appropriate uses of the CLEP General Examination in Mathematics include,

> Meeting suitable general mathematics area requirements as required by some institutions. Here some effort should be made to determine that individuals granted credit through the General Mathematics Examination have acquired a level of mathematical maturity comparable to students who successfully complete the institution's courses designed to meet the general mathematics requirements.[2]

And, although the American Dental Association's Council on Dental Education recommends that credit be awarded at the 50th percentile of the appropriate subgroup of the national norming group (dental assistants, dental hygienists, or dental laboratory technicians), it recommends further that, "institutions administer the CLEP examinations in addition to their own examinations to their students, to develop local normative data and/or review the results of their students' participation in the national normings."[3]

Institutional Use of Published Data and Recommendations

Now let us take a look at how institutions have used the data and recommendations provided to them and how they go about deciding what cutoff scores to

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[1] In CLEP Scores, 1980-81, p. 43.

[2] "The CLEP General Examination in Mathematics: A Joint Statement from the College Board and the Mathematical Association of America," Ibid., p. 45.

[3] "Recommendations of the American Dental Association's Council on Dental Education," Ibid., p. 45.

use. Results of the 1975 national survey of colleges and universities give us an inkling. The institutions were asked to identify from a list of seven, the methods they used to determine their General Examination cutoff scores. Following is a tabulation of the results.

Standards Used by Institutions to Set Cutting Scores on the General Examination[1]

	Number of Institutions	Percentage of Institutions*
Standards are set from national norms.	288	59%
Standards are set by faculty review of tests.	183	37%
Standards of comparable institutions are used as a guide.	174	35%
Standards are based upon our own norming studies.	77	16%
Standards are set by statewide policy.	74	15%
Credit is awarded at the 25th percentile score following the American Council on Education recommendation.	74	15%
Each division or department sets its own standards.	53	11%
Standards are set based upon considerations not mentioned above.	50	10%

*Percentiles do not total 100 because respondents could check more than one standard.

It should be noted that these methods are not mutually exclusive, and that more than half of the 526 respondents indicated they used more than one of these methods.

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[1]Grandy and Shea, p. 9.

A survey conducted today would likely produce quite different results. I believe three primary sources of information are currently used by institutions: 1) The ACE recommendation, which has been changed to a range for the General Examinations rather than a minimum score as was the case at the time of this survey; 2) the published interpretive data, based on 1963 (1972) national reference data--upon which, of course, the ACE recommendations are based; and 3) the policies of other colleges and universities. Faculty review of tests supplements these methods, but often only indicates whether a test matches the curriculum and not the level at which the cutoff score is set. In some cases, and increasingly, each department or division considers all or some of the above information to set the institutional policy.

In only a few cases are local norming studies conducted. It is estimated that applications have been submitted, over the years, for about 500 local administrations of tests as part of standard-setting or validity studies by perhaps 100 institutions. When one considers that there are in the neighborhood of 30,000 individual test policies at more than 1500 colleges and universitites across the country, this number is quite small. One should, perhaps, add to this number the 3,000 or so test administrations conducted at institutions as part of College Board-sponsored studies to collect reference data or to equate new forms of tests.[1] However, it is unknown how many of the participating institutions have actually used that data for anything more than final examinations or to evaluate the performance of their own students in relation to that of students at other colleges. In the two years I have been coordinating these studies at ETS, equating or reference data have been collected for approximately 20 examinations. My offers to assist institutions in planning how they might

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[1] See pages 25 to 33 in CLEP Scores, 1980-81, attached, for lists of institutions that have participated in national studies for the collection of reference data.

use the results and my requests for copies of reports the participating institutions prepare if they use the data for an internal study, have gone totally unanswered; I have not yet received one request or one report.

There have been some carefully planned and executed institutional studies. Properly written research reports are, however, few and far between. Studies such as those conducted at the University of Texas at Austin, the University of Iowa, Utah State University, Arkansas State University, Wichita State University, and others, which use test performance data to evaluate the validity of an established cutoff score, or to derive a valid cutoff score, are rare--as are follow-up studies on students who have been granted or denied CLEP credit, such as those of Central Michigan University and the State of Florida CLEP Task Force.[1]

There is probably a number of institutions that have informally reviewed their students' performance on CLEP examinations and related coursework; however, the extent to which this is true is difficult to assess. Often decisions are made on hunches that "too many" students are getting credit through CLEP examinations--or on speculation that those granted CLEP credit are not doing well in subsequent courses. Although few would admit it, the increasing fears of faculty that FTEs and faculty jobs are lost to their institutions also contribute to decisions that a cutoff score is inappropriate or a test invalid.

Two examples demonstrate how lack of a firm rationale for setting a CLEP policy can result in extreme action by institutions. Faculty at one college were alarmed at the numbers and abilities of students to whom it was granting credit for required math and English courses based on the CLEP General Examinations. They noted that the college administration had set the cutoff scores for these

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[1] One reference for each of these organizations is included in the bibliography. Some, however have conducted more than one study or prepared more than one report. Please note that this is not intended to be an exhaustive list of worthy studies, but is meant to be illustrative.

tests at the 25th percentile, and demanded that they be raised to the 75th percentile--effectively preventing all but the most gifted students from being exempted from these courses.

At another college, the cutoff score had been raised from the 25th to the 50th percentile on the five General Examinations to prevent unqualified students from being exempted from the liberal arts courses. But still, "95 percent of those who took the tests were passing." The institution's solution was to discontinue use of all the General Examinations. A postscript to this story is that, according to national program data, the mean scores of the 30- to 40,000 candidates per year who took each General Examination from 1972 to 1977 were within 20 scaled score points of (and in all but Mathematics below) the 50th percentiles of the respective reference groups. Thus, it is unlikely that at any single college, except perhaps the most competitive, 95 percent of candidates would be earning scores above the 50th percentile in all five examinations.

In CLEP's early days, college and university administrators often enacted CLEP policies without significant involvement or concern of faculty. Faculty only became concerned in large numbers when they began to notice that more than an occasional student was being granted credit or exemption through CLEP. The increasing interest and power of faculty in setting institutional policy in general has also contributed to the increased involvement of faculty in setting or changing CLEP policy.

From the limited data available, it appears that many (but not most) institutions initially set their cutoff scores for awarding credit for the General Examinations at the 25th percentile, the minimum score recommended by the American Council on Education. As they gained experience with this cutoff score and as more students began to earn credit, these institutions began to

raise their cutoff scores to the 50th percentile and above. No reliable data are available on the points at which cutoff scores were set prior to 1974. A spring 1975 survey of CLEP user institutions' produced a table which ACE included in its 1976 recommendation (see page 15 above). From this table, it appears that close to 20 percent of the institutions were granting credit at some point below the 35th percentile, and almost an additional 75 percent had cutoff points in the 35th to 50th percentile range. Thus, less than 10 percent had required scores above the 50th percentile. Using data that are not strictly comparable from another source, the 1978 College Placement and Credit by Examination,[1] it appears that three years later the proportion of institutions offering credit below the 35th percentile had dropped to 15 percent, and those granting credit from the 35th to 50th percentile had dropped to less than 50 percent. Thus, in 1978 about a third of user institutions, as compared with less than one-tenth in 1975, were requiring scores above the 50th percentile. It is clear then, that institutions have been increasing their cutoff scores since they established their initial policies. What is disturbing is that some have raised their cutoff scores unreasonably high, and others have dropped the use of the General Examinations altogether, because of their dissatisfaction with an initial cutoff score that was apparently too low.

The change over the years may be in part due to what Walter Shea referred to in last year's NCME cutoff score symposium as "collective wisdom."[2] Institutions seem to watch closely what neighboring institutions are doing, particularly those from which or to which their students often transfer. In

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[1]The 1975 and 1978 respondents were not the same, although both responded to national surveys. There were 535 respondents in 1975, and about 750 in 1978. Further, the data from the two surveys were tabulated by different ranges of scaled scores, and no conversions to percentile ranks were made in the reports.

[2]Shea, p. 6.

some areas, for example the state of Florida, articulation agreements between two-year and four-year institutions have been drawn up, thus ensuring students who transfer that their CLEP credits will be accepted. One CLEP test center director stated that his college's first General Examination cutoff scores had been set at the 25th percentile. After a few years, they were raised to the 50th percentile because the 25th proved to be too low. A few years ago, they were raised to the 75th percentile "because we wanted to start a trend toward higher standards. But no one followed us, so we changed it back to 50. We have to do what other colleges in our area are doing."

Another example of "collective wisdom" involves the American Council on Education. ACE's first General Examination recommendation was intended to guide institutions--and many it did. But in 1976, the Council's recommendation was changed to reflect what most institutions were already doing as indicated in the 1975 survey results. Based on this information, ACE announced that cutoff scores should fall in a range within which 90 percent of the institutions had already set their cutoff scores (421 to 500, or approximately the 25th to 54th percentile). In response, many institutions that had cutoff scores set at the 50th percentile (which fell a few points below 500 for each examination), apparently raised their cutoff scores to 500--the top of the new ACE recommended range. This is evidenced by the results of the 1978 survey for College Placement and Credit by Examination, which showed a substantial increase in institutions requiring a score somewhat above the 50th percentile.[1]

The pattern of Subject Examination cutoff scores is also indicative of "collective wisdom". The survey conducted for the 1978 policy book shows that

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[1] College Placement and Credit by Examination (1978), p. 402.

the vast majority of colleges (more than 90 percent) have set their cutoff scores between 45 and 54 (approximately the 35th to the 65th percentile).[11] Most institutions use either the "mean C," as recommended by the American Council on Education, or the 50th percentile. Scaled scores for both of these points usually fall within 2 to 3 points of 50, but the mean C is generally a point or two lower than the 50th percentile. Although it cannot be determined conclusively from the data reported in the policy handbook, it appears that about half use the mean C, and about a fourth use the 50th percentile. Of the remaining fourth, most have cutoffs between the 55th to 60th percentile, while perhaps five percent use cutoffs higher than the 60th or lower than the 35th percentile. There are no earlier data with which to compare these relatively current data. Because ACE's cutoff score recommendation for the Subject Examinations was the 25th percentile prior to 1972, it is likely that a number of institutions used this cut-point. It is probably due to the earlier change from the 25th percentile for the Subject Examinations that there has been less dissatisfaction vocalized about Subject Examination policies than about General Examination policies.

There seems to be a tendency among institutions to use cutoff points or data suggested or at least mentioned by the College Board or ACE. For the General Examinations, institutions nearly always use the 25th, 50th, or 75th percentile, the only points for which scaled scores were published before 1981 (see Appendix A), or 500, the top of the 1976 ACE recommended range. Since the "advisory" on the new English Composition examination and subsequent recommendation by ACE, many institutions seem to use 610, the top point of the recommended

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[11] College Placement and Credit by Examination (1978), p. 402.

[12] Ibid., pp. 403-405.

range. There is some evidence that in the early days of the program some institutions used different cutoff points for male and female students based on the "sex norms" published in the first CLEP score interpretation guide. A 1971 survey of institutions in Missouri[1] showed that four of thirty responding institutions used the "sex norms." For the Subject Examinations, the "mean C" is most often used, but many also use the 50th percentile, for which scaled score points were reported in the 1978 policy book.[2] Only a few institutions seemingly have felt free to use other points such as the 60th or 35th percentile, or points based on local performance data independent of the national data. When they do deviate, there is rarely a firm rationale given for the choice of a cutoff score--as one college administrator said, "They (departmental faculty) just pick something out of the air that sounds good."

Recently, I received a frantic phone call from a department chair whose faculty were militating for the elimination of the institution's use of a particular CLEP test to award credit. "Too many" students were getting credit at the mean C cutoff score. Someone had suggested that they raise the cutoff score to the "mean B" level, which has also been reported in CLEP interpretive guides (see Appendix A, page 40, and page 19 of the attached CLEP Scores), but some staff warned that doing so would be in violation of ACE recommendations. They seemed relieved when I assured them that they could set their cutoff score at whatever point they chose, that the "mean C" was the point recommended as a minimum cutoff point by ACE, and that the use of the mean B seemed to be a reasonable adjustment if unqualified students were getting credit--certainly preferrable to dropping use of the test altogether.

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[1] Fagin, "Report of Institutional Policies of Missouri Colleges and Universities."

[2] College Placement and Credit by Examination (1978), p. xv.

Institutions need and want the guidance of the test-makers and sponsors, and of others who are knowledgeable about measurement. They look to the College Board, ACE, ETS--and each other--for advice, assistance, and reassurance. Ideally, the use of results of local studies is preferable to use of national data, but often requires disproportionate amounts of institutional time and effort. Institutions often lack staff who have both the time and the skills required to plan, organize, coordinate, and write up the results of such studies. The cooperation and commitment of the faculty are also required. To conduct a standard-setting administration requires two one-hour class periods of a term that often goes all too quickly--in addition to the follow-up work in which the faculty should be involved if the conclusions are to have validity. In addition, some faculty feel that multiple-choice tests cannot measure the kinds of abilities they teach, or are concerned about administering a test which covers some material that they have not taught. Some administrators and outside observers believe that faculty fear having their students compared with students in other classes or institutions, and possibly being evaluated by the test results. Others believe that faculty (and administrators) do not wish to make the effort required to make a decision based on performance data, but prefer to be given a passing score that they can feel free to reject.

Whatever the reasons, the fact that institutions require guidance and assistance must be recognized. Efficient methods that require a minimum of faculty, student, and institutional time are needed for making decisions about test use that are appropriate for their own circumstances.

One efficient method that might be used involves the review of an existing policy by identifying the decision errors that have been made. This would involve the registrar's office or the testing office keeping a tally by test of

students submitting CLEP scores. Each student's score, and whether or not he or she was eligible for credit under the institution's policy would be recorded. Data on performance in subsequent related coursework, such as course grades or faculty ratings, or the student's own opinion of whether or not the correct decision had been made based on his or her experience in subsequent coursework. After data on sufficient cases are compiled, correct, false-positive, and false-negative decisions could be identified from the data and used to confirm or disprove the appropriateness of the cutoff score, and to adjust it if necessary. This procedure is particularly feasible for institutions to which significant numbers of students submit CLEP scores, and has the advantage of not involving the use of class time to administer the tests.

The College Board and the American Council on Education could aid institutions in conducting studies by providing a set of guidelines, providing one or more model or skeleton reports, and disseminating outstanding research reports. One or more persons conversant in research methodology might be commissioned to advise institutions and assist them in planning, conducting, and reporting their studies.

Conclusion

The development and ongoing review of institutional CLEP policies should be a joint endeavor of faculty and administrators. On the one hand, college administrators should not make decisions on use of subject matter tests without input from appropriate faculty; on the other hand, faculty should not be permitted to influence the policies to the extent that CLEP credit is awarded only at exceedingly high scores--or not given at all--without evidence that such positions are justified. A concerted effort should be made by test-makers, sponsors, and professional associations, to advise and assist institutions with the process of

developing credit-by-examination policies that are equitable and that reflect the academic standards of the institution. We all need to work together, giving the highest priority to high quality, efficient education opportunities for all students, without allowing political considerations or emotionalism to interfere with this goal.

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APPENDIX A

The following "sophomore norms" tables, with "sex norms," for the General Examinations appeared in the 1967, 1973, and 1981 CLEP score interpretation guides.

Table 1

GENERAL EXAMINATIONS

Percentile Ranks
College Sophomores—Spring 1963

Scaled score	ENGLISH			HUMANITIES			MATHEMATICS			NATURAL SCIENCES			SOCIAL SCIENCES-HISTORY			Scaled score
	Men	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	
800																800
780																780
760					99	99	99						99			760
740		99		99	98	98	98		99	99			98		99	740
720		98	99	98	96	97	97		98	98		99	97		98	720
700	99	97	98	97	95	96	96		98	96		97	96		97	700
680	98	96	97	96	93	95	93	99	96	94	99	96	94	99	96	680
660	95	94	95	94	92	93	89	98	93	92	97	94	90	98	94	660
640	93	91	92	93	90	92	85	96	90	88	94	91	85	95	90	640
620	90	86	88	91	85	88	79	95	86	82	93	87	82	93	87	620
600	86	79	83	88	79	84	75	93	83	77	89	83	77	89	83	600
580	82	73	78	85	74	80	68	91	79	70	86	77	72	85	78	580
560	78	66	73	78	67	73	61	87	73	64	82	73	66	80	73	560
540	74	57	66	73	60	67	53	83	67	59	78	68	63	73	68	540
520	67	50	59	69	51	61	46	77	60	48	72	60	56	67	61	520
500	60	43	52	63	43	54	41	72	55	43	66	54	49	59	54	500
480	51	35	44	57	36	47	33	65	47	39	58	47	41	53	47	480
460	43	28	36	48	28	39	28	57	41	32	46	39	34	44	39	460
440	35	22	29	39	24	32	23	48	34	25	38	31	28	34	30	440
420	27	16	22	29	18	24	18	38	27	19	29	24	20	27	24	420
400	21	12	17	20	13	16	14	28	21	15	22	18	15	19	17	400
380	15	9	12	12	9	11	8	15	11	9	13	11	10	14	12	380
360	10	6	8	7	5	6	2	4	3	5	9	7	6	10	8	360
340	6	4	5	4	1	3				3	6	4	3	5	4	340
320	4	3	4	1						1	3	2	1	3	2	320
300	2	2	2								2	1		1	1	300
280	1	1	1													280
Mean	482	516	498	483	518	499	529	461	498	518	474	498	514	481	498	**Mean**
Standard deviation	98	98	99	97	99	99	102	80	99	102	90	99	104	91	99	**Standard deviation**
No. of sophomores	1375	1207	2582	361	317	678	360	303	663	343	290	633	310	297	607	**No. of sophomores**

Scaled Scores for Selected Percentiles

Percentile																Percentile
75	545	585	570	549	582	564	600	513	566	595	528	571	594	550	568	75
50	477	520	494	483	516	489	530	444	487	523	465	489	505	473	488	50
25	413	451	428	414	444	422	448	394	413	440	406	424	433	413	423	25

APPENDIX A (cont.)

Table B

GENERAL EXAMINATIONS

Percentile Ranks for Subscores
College Sophomores—Spring 1963

Scaled score	HUMANITIES		MATHEMATICS		NATURAL SCIENCES		SOCIAL SCIENCES-HISTORY	
	Fine Arts	*Literature*	*Skills*	*Content*	*Biological*	*Physical*	*Social Sciences*	*History*
80				99				
75	99	98		97		99		99
70	97	96		96	98	96	96	97
65	91	92	94	91	94	91	93	92
60	83	85	81	85	85	83	83	82
55	71	71	64	76	69	73	69	71
50	53	55	49	66	51	55	53	55
45	34	36	34	42	32	38	32	37
40	18	18	22		20	16	18	17
35	4	3	7		7	3	7	5
30	1				1		2	
25								
Mean	50	50	50	50	50	50	50	50
Standard deviation	10	10	10	10	10	10	10	10
No. of sopho-mores	674	674	659	659	630	630	604	604

APPENDIX A (cont.)

The following "freshman norms" tables for the General Examinations appeared in the 1967 score interpretation guide.

Table 3

GENERAL EXAMINATIONS

Percentile Ranks
College Freshmen—Spring 1964

Scaled score	ENGLISH			HUMANITIES			MATHEMATICS			NATURAL SCIENCES			SOCIAL SCIENCES-HISTORY			Scaled score
	Men	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	
800																800
780							99									780
760							98		99							760
740				99	99	99	97		98	99			99			740
720	99	99	99	98	98	98	96		97	98		99	98		99	720
700	98	98	98	95	98	97	93	99	96	97	99	98	97		98	700
680	97	96	96	94	97	96	90	98	93	94	97	95	96	99	97	680
660	94	93	94	93	95	94	87	97	91	91	96	93	94	98	96	660
640	92	90	91	92	93	93	84	95	89	86	96	90	92	96	94	640
620	89	86	87	91	91	91	79	93	86	83	95	88	89	93	91	620
600	85	80	83	88	87	87	74	91	82	80	92	85	84	90	87	600
580	81	75	78	85	82	83	67	87	76	76	89	82	82	88	85	580
560	76	67	72	80	77	78	60	84	71	69	86	77	78	85	81	560
540	71	60	66	76	70	73	53	78	64	61	82	70	68	79	73	540
520	64	54	59	71	65	68	45	75	59	52	75	62	63	73	68	520
500	58	46	52	66	59	62	38	70	53	45	67	55	56	66	61	500
480	50	38	45	59	50	54	31	61	45	39	58	48	49	59	54	480
460	43	33	38	50	43	46	26	53	38	33	49	40	41	51	46	460
440	36	26	31	41	34	37	22	44	32	28	41	33	34	43	38	440
420	30	21	25	33	26	30	17	37	26	22	35	28	25	36	30	420
400	25	17	21	27	17	22	12	28	20	16	28	22	18	29	23	400
380	19	12	16	19	11	15	9	20	14	11	22	16	12	21	16	380
360	14	10	12	12	7	9				7	14	10	9	14	11	360
340	10	7	9	7	4	6				4	11	7	5	9	7	340
320	6	5	6	3	2	2				2	7	4	2	5	3	320
300	4	3	4	1		1				2	4	3		2	1	300
280	2	2	2								1	1				280
260	1	1	1													260
240																240
220																220
200																200
Mean	482	506	493	475	489	482	534	467	504	512	461	489	492	463	479	**Mean**
Standard deviation	107	105	107	104	94	99	105	88	103	104	95	103	98	93	97	**Standard deviation**
No. of freshmen	1332	1189	2521	321	333	654	350	292	642	339	287	626	322	277	599	**No. of freshmen**

Scaled Scores for Selected Percentiles

Percentile																Percentile
75	556	580	570	534	554	549	603	525	576	577	519	553	554	528	545	75
50	479	510	496	461	479	468	529	452	495	514	461	485	482	459	470	50
25	401	436	418	396	418	410	454	395	416	434	389	413	419	390	405	25

APPENDIX A (cont.)

Table 6

GENERAL EXAMINATIONS

Percentile Ranks for Subscores
College Freshmen—Spring 1964

Scaled score	HUMANITIES		MATHEMATICS		NATURAL SCIENCES		SOCIAL SCIENCES-HISTORY	
	Fine Arts	*Literature*	*Skills*	*Content*	*Biological*	*Physical*	*Social Sciences*	*History*
80				99				
75		99		96				
70	98	97		92	97	96	99	98
65	93	94	92	88	93	92	96	93
60	87	88	79	83	86	84	89	86
55	76	77	63	74	74	74	78	75
50	59	61	49	62	57	54	63	61
45	42	41	32	37	39	34	42	41
40	23	22	21		25	16	26	19
35	7	5	10		10	6	12	7
30	1				2		2	
25								
Mean	48	48	50	51	48	50	47	49
Standard deviation	10	10	10	10	11	10	10	10
No. of freshmen	654	654	642	642	626	626	599	599

APPENDIX A (cont.)

The following "senior norms" tables for the General Examinations appeared in the 1967 score interpretation guide.

Table 4

GENERAL EXAMINATIONS

Percentile Ranks
College Seniors—Spring 1966

Scaled score	ENGLISH			HUMANITIES			MATHEMATICS			NATURAL SCIENCES			SOCIAL SCIENCES-HISTORY			Scaled score
	Men	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	*Men*	*Women*	*Total*	
800							99		99							800
780				98		99	96		98	99						780
760				97		98	96		98	97		99				760
740	98	99	99	94	98	96	94		97	97		98	99		99	740
720	97	97	97	93	94	94	92		96	94		97	96		98	720
700	96	95	96	90	92	91	88		93	93		96	93		96	700
680	95	93	94	88	89	89	86		92	89	99	93	89		93	680
660	93	88	90	84	87	85	84	99	91	85	97	91	85	99	91	660
640	91	83	87	77	84	80	81	97	88	81	96	88	80	93	85	640
620	89	78	84	71	80	74	78	95	86	74	93	83	77	91	83	620
600	86	71	79	67	75	70	74	94	83	71	90	80	74	87	79	600
580	80	59	71	64	66	65	71	92	80	69	88	78	65	84	73	580
560	71	54	63	57	61	58	62	88	74	66	81	73	60	79	68	560
540	63	43	54	51	51	51	57	86	70	61	77	68	50	73	60	540
520	56	35	47	46	45	46	53	83	66	54	72	62	43	67	53	520
500	49	29	40	39	35	38	47	73	58	42	64	52	39	57	46	500
480	39	25	33	34	29	32	42	66	53	36	56	45	33	46	38	480
460	33	21	28	27	24	26	37	58	47	32	44	37	29	37	32	460
440	26	17	22	24	19	22	32	47	38	23	36	29	18	31	23	440
420	21	12	17	16	14	15	24	38	30	17	27	22	11	24	16	420
400	16	7	12	9	11	10	17	24	20	12	20	16	9	12	10	400
380	12	6	9	6	7	6	9	14	11	6	14	10	6	7	6	380
360	9	4	7	4	4	4	6	8	7	3	11	6	4	5	4	360
340	7	2	5	1	3	2	2	4	3	2	8	4	2	3	3	340
320	5	1	3		2	1	1	2	1	1	5	3	1	1	1	320
300	2		1		1						2	1				300
280											1					280
260																260
240																240
Mean	503	546	522	543	536	540	525	457	495	529	474	504	537	491	519	Mean
Standard deviation	103	96	103	113	103	109	122	78	110	110	91	105	103	83	98	Standard deviation
No. of seniors	133	106	239	142	90	232	128	102	230	116	99	215	131	90	221	No. of seniors

Scaled Scores for Selected Percentiles

Percentile																Percentile
75	571	612	590	633	600	624	608	506	567	623	529	567	608	548	587	75
50	505	552	528	537	387	537	514	447	470	511	472	496	539	491	510	50
25	431	480	452	448	462	456	422	402	409	443	416	428	452	422	443	25

APPENDIX A (cont)

Table 7

GENERAL EXAMINATIONS

Percentile Ranks for Subscores—College Seniors—Spring 1966

Scaled score	HUMANITIES		MATHEMATICS		NATURAL SCIENCES		SOCIAL SCIENCES-HISTORY	
	Fine Arts	*Literature*	*Skills*	*Content*	*Biological*	*Physical*	*Social Sciences*	*History*
80	99			98				
75	97	98		95	97	98		99
70	91	92	99	92	95	95	98	96
65	83	87	91	89	88	90	90	90
60	70	72	84	84	78	83	77	80
55	55	57	69	78	67	72	60	69
50	41	40	54	65	53	54	42	52
45	23	25	37	50	33	32	21	36
40	11	10	22	11	17	17	8	15
35	2	3	8	10	9	5	2	5
30	1	1	1	8	1	1	1	1
25								
Mean	54	53	49	50	51	50	53	50
Standard deviation	11	11	10	11	11	10	9	10
No. of seniors	232	232	230	230	215	215	221	221

APPENDIX B

The 1972 reference data for the General Examination in Mathematics were reported as follows in the 1973 and 1976 score interpretation guides.

Table 7

General Examinations

Mathematics—Total Score

Scaled Scores and Corresponding Percentile Ranks

College Sophomores—Spring 1972

SCALED SCORE	PERCENTILE RANK
800	
780	
760	
740	
720	99
700	98
680	96
660	93
640	91
620	86
600	82
580	77
560	71
540	65
520	58
500	51
480	44
460	38
440	30
420	24
400	18
380	13
360	8
340	4
320	2
300	1
280	
260	
240	
220	
200	

Scaled Scores for Selected Percentiles

PERCENTILE	SCALED SCORE
75	575
50	497
25	424

APPENDIX B (cont.)

Table 8

General Examinations

Mathematics—Subscores

Scaled Scores and Corresponding Percentile Ranks

College Sophomores—Spring 1972

SCALED SCORES	PERCENTILE RANKS	
	Skills	*Content*
80		
75	99	99
70	97	98
65	92	92
60	83	82
55	68	69
50	50	50
45	32	34
40	17	18
35	7	6
30	1	1
25		
20		

Scaled Scores for Selected Percentiles

PERCENTILE	SCALED SCORES	
	Skills	*Content*
75	57	57
50	50	50
25	43	42

APPENDIX C

The following interpretive data for the General Examinations were reported in a supplement to the 1976 score interpretation guide.

Table 1

CLEP General Examinations—Total Scores

Percentile Ranks of Students Enrolled in Appropriate Courses at Selected Colleges and Universities in Spring 1978

Scaled Scores	PERCENTILE RANKS				
	English Composition*	Humanities	Mathematics	Natural Sciences	Social Sciences and History
720 & above	99			99	
700	98			98	
680	96		99	97	
660	94	99	98	96	
640	91	97	97	94	
620	88	96	95	91	99
600	83	93	93	88	97
580	78	91	91	85	95
560	72	87	88	82	92
540	65	82	84	77	86
520	59	77	78	73	79
500	51	70	71	67	72
480	43	61	65	62	63
460	36	54	57	54	54
440	29	44	47	46	43
420	22	35	37	39	31
400	17	27	27	32	21
380	13	19	17	23	15
360	9	11	10	16	8
340	5	7	4	10	4
320	3	4	1	6	1
300	2	1		4	
280 & below	1			1	
Mean	500	460	459	462	459
Standard Deviation	100	85	83	103	71
Number of Students	2,290	757	1,214	883	794
Percentile	SCALED SCORES FOR SELECTED PERCENTILES				
75	589	514	510	530	507
50	496	452	446	447	453
25	430	397	396	383	406

*Because scores for the 90-minute edition of English Composition were rescaled, no comparison should be made between scores obtained for the 60-minute and the 90-minute editions.

Table 2

CLEP General Examinations—Subscores

Percentile Ranks of Students Enrolled in Appropriate Courses at Selected Colleges and Universities in Spring 1978

Scaled Scores	PERCENTILE RANKS							
	Humanities		Mathematics		Natural Sciences		Social Sciences and History	
	Sub. 1 Fine Arts	Sub. 2 Literature	Sub. 1 Skills	Sub. 2 Content	Sub. 1 Biological	Sub. 2 Physical	Sub. 1 Soc. Sci.	Sub. 2 History
80								
75						99		
70	99		99	99	99	96		
65	98	99	98	97	95	93	99	99
60	91	94	89	92	89	88	95	97
55	77	88	79	85	79	77	83	92
50	57	73	64	73	67	62	60	77
45	35	51	43	56	50	44	37	56
40	15	29	21	30	32	21	15	33
35	3	9	8	10	15	6	4	8
30		1	1	1	4			
25								
Mean	48	45	47	48	48	48	48	44
Stand. Dev.	8	8	9	9	10	10	7	7
No. of Stud's	757		1,214		883		794	

Table 3

CLEP General Examinations—Total Scores

Percentile Ranks of College Sophomores in Spring 1983 (For Mathematics the data are based on the performance of college sophomores in the spring of 1972.)

(Data for English Composition are not presented because data from the 60-minute test are not comparable to data for the 90-minute test.)

Scaled Scores	PERCENTILE RANKS			
	Humanities	Mathematics	Natural Sciences	Social Sciences and History
760 & above	99			
740	98			99
720	97	99	99	98
700	96	98	97	97
680	95	96	96	96
660	93	93	94	94
640	92	91	91	90
620	88	86	87	87
600	84	82	83	83
580	80	77	77	78
560	73	71	73	73
540	67	65	68	68
520	61	58	60	61
500	54	51	54	54
480	47	44	47	47
460	39	38	39	39
440	32	30	31	30
420	24	24	24	24
400	16	18	18	17
380	11	13	11	12
360	6	8	7	8
340	3	4	4	4
320	1	2	2	2
300		1	1	1
280 & below				
Mean	499	500	498	498
Standard Deviation	99	100	99	99
Number of Sophomores	678	1,562	633	807
Percentile	SCALED SCORES FOR SELECTED PERCENTILES			
75	564	575	571	568
50	499	497	499	498
25	422	424	424	423

Table 4

CLEP General Examinations—Subscores

Percentile Ranks of College Sophomores in Spring 1983 (For Mathematics, the data are based on the performance of college sophomores in the spring of 1972.)

Scaled Scores	PERCENTILE RANKS							
	Humanities		Mathematics		Natural Sciences		Social Sciences and History	
	Sub. 1 Fine Arts	Sub. 2 Literature	Sub. 1 Skills	Sub. 2 Content	Sub. 1 Biological	Sub. 2 Physical	Sub. 1 Soc. Sci.	Sub. 2 History
80								
75	99	98	99	99		99		99
70	97	96	97	96	96	96	96	97
65	91	92	92	92	94	91	93	92
60	83	85	83	82	85	83	83	82
55	71	71	68	69	69	73	69	71
50	53	55	50	50	51	55	53	55
45	34	36	32	34	32	36	32	37
40	18	18	17	18	20	16	18	17
35	4	3	7	6	7	3	7	5
30	1		1	1	1		2	
25								
Mean	50	50	50	50	50	50	50	50
Stand. Dev.	10	10	10	10	10	10	10	10
No. of Stud's	674		1,562		630		804	

APPENDIX C (cont.)

Table 5

CLEP General Examinations—Total Scores

Percentile Ranks of 1977-78 Candidates

(Data for English Composition are not presented because data from the 60-minute test are not comparable to data for the 90-minute test.)

Scaled Scores	PERCENTILE RANKS			
	Humanities	Mathematics	Natural Sciences	Social Sciences and History
700 & above		99		
690		98	99	
680	99	95	98	
640	98	92	96	99
620	96	87	94	97
600	94	82	91	95
580	90	75	87	92
560	86	69	82	88
540	80	61	76	82
520	74	53	70	75
500	66	47	61	66
480	56	40	52	57
460	45	33	43	46
440	34	26	34	35
420	25	21	25	25
400	17	15	18	16
380	10	11	11	9
360	6	7	6	4
340	3	4	3	2
320	1	2	1	1
300		1		
280 & below				
Mean	474	506	480	472
Standard Deviation	77	98	84	72
Number of Candidates	32,929	27,412	30,002	31,483
Percentile	SCALED SCORES FOR SELECTED PERCENTILES			
75	523	580	538	520
50	470	509	475	467
25	419	436	420	420

Table 6

CLEP General Examinations—Total Scores

Scaled Scores for Selected Percentiles

Percentile Rank	SCALED SCORES					
	Humanities			Mathematics		
	1978 Students	1977-78 Candidates	1963 Students	1978 Students	1977-78 Candidates	1972 Students
75th	514	523	564	510	580	575
50th	452	470	489	446	509	497
25th	397	419	422	396	436	424

Percentile Rank	SCALED SCORES					
	Natural Sciences			Social Sciences and History		
	1978 Students	1977-78 Candidates	1963 Students	1978 Students	1977-78 Candidates	1963 Students
75th	530	538	571	507	520	568
50th	447	475	489	453	467	488
25th	383	420	424	406	420	423

Table 7

Range of Formula Scores and Number of Correct Answers Necessary to Obtain Selected Scaled Total Scores for the 90-minute Edition of CLEP General Examinations*

Scaled Scores	English Composition (130)		Humanities (150)		Mathematics** (120)		Natural Sciences (120)		Social Sciences and History (125)	
	Formula Scores	Correct Answers	Formula Scores	Correct Answers	Formula Scores	Correct Answers	Formula Scores	Correct Answers	Formula Scores	Correct Answers
600	72-74	72-86	109	109-117	71-72	71-84	71	71-81	82-87	82-95
580	61-63	61-76	92	92-104	58	58-74	60	60-72	68-73	68-83
560	51-52	51-68	75-76	75- 91	43-45	43-64	49	49-63	54-59	54-72
540	40-41	40-59	58-59	58- 77	29-32	29-54	37-38	37-54	41-45	41-61
520	30	30-50	41-42	41- 64	14-19	14-44	26-27	26-46	27-31	27-50

*Maximum possible formula score for each examination is given in parentheses.

**The total formula score for Mathematics is derived as follows: formula score for subscore 1 + 1.6 x formula score for subscore 2.

APPENDIX D

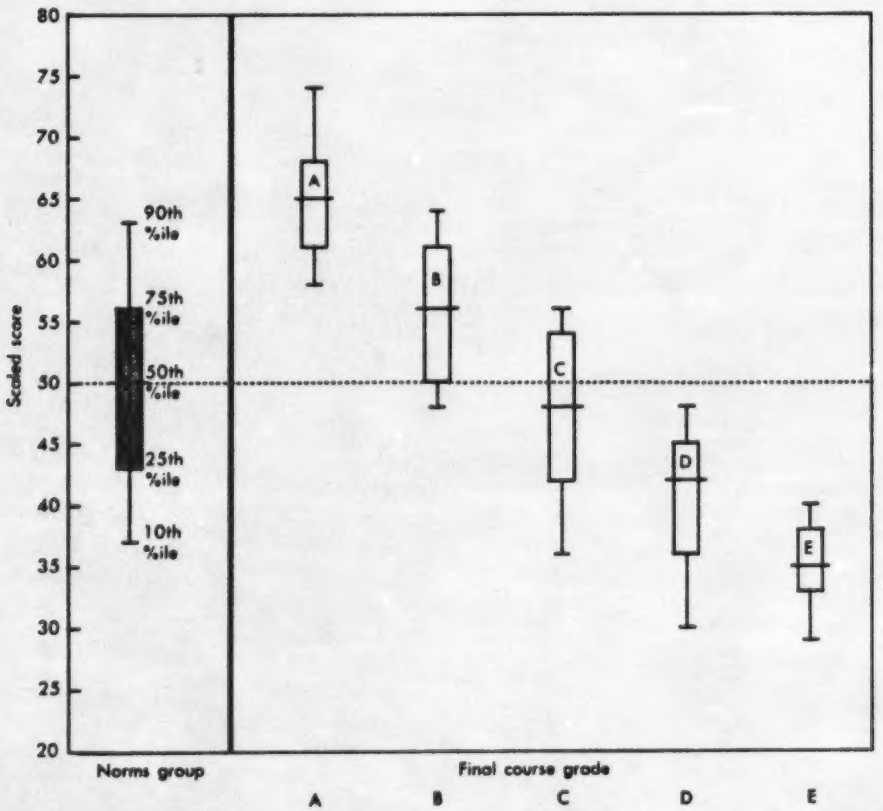
The following Subject Examination interpretive data appeared in the 1967 score interpretation guide: 1) a graph for each examination (such as Figure 5 below) showing scaled score distributions by final course grades, 2) table of percentile ranks.

Figure 5

SUBJECT EXAMINATION

GENERAL PSYCHOLOGY

Scaled Score Distributions by Final Course Grade
Spring 1967



		A	B	C	D	E
Mean	50	65	55	47	41	35
No. of students	574	55	139	313	45	11
% earning each grade	–	10%	24%	55%	8%	2%

APPENDIX D (cont.)

Table 8

SUBJECT EXAMINATIONS

Percentile Ranks

Scaled score	AMERICAN GOVERNMENT*	ANALYSIS & INTERPRETATION OF LITERATURE	ENGLISH COMPOSITION	GENERAL CHEMISTRY	GENERAL PSYCHOLOGY	GEOLOGY	INTRODUCTORY CALCULUS	INTRODUCTORY ECONOMICS	INTRODUCTORY SOCIOLOGY	MONEY & BANKING	STATISTICS	TESTS AND MEASUREMENTS**	WESTERN CIVILIZATION
80													
75			99	97	99		99	99		98	98	99	99
70	98	98	97	95	98	98	97	97	96	96	96	96	97
65	94	94	92	92	94	94	92	91	95	92	92	91	93
60	85	85	83	84	83	84	84	84	83	84	83	83	83
55	66	65	71	74	69	68	70	71	66	72	71	71	69
50	49	46	50	58	49	48	51	54	48	55	57	52	52
45	31	33	32	38	32	29	35	31	33	33	33	33	35
40	17	18	17	12	16	17	15	18	15	16	14	17	18
35	8	8	6	2	7	8	6	5	8	3	4	6	4
30	2	2	2		3	2	1		3	1	1		
25	1					1			1				
20													
Mean	50	50	50	50	50	50	50	50	50	50	50	50	50
Standard deviation	10	10	10	10	10	10	10	10	10	10	10	10	10
No. of students	921	541	486	471	574	301	483	636	258	924	1341	326	291

*Norms based on two testing administrations—spring 1965 and 1966
**Norms based on two testing administrations—spring 1964 and 1965

APPENDIX D (cont.)

The following table showing mean scaled scores by final course grades appeared in the 1973 score interpretation guide. Similar tables appeared in the 1976 and 1981 editions of the guide.

Table 13

Subject Examinations

Correlations between Scaled Scores and Final Course Grades

TEST	MEAN SCALED SCORE BY FINAL GRADE					PERCENTAGE OF STUDENTS EARNING GRADE					NO. OF STUDENTS	CORRELATIONS BETWEEN SCALED SCORES AND FINAL COURSE GRADES
	A	B	C	D	E	A	B	C	D	E		
Accounting, Introductory	61	56	50	47	44	14%	25%	34%	20%	7%	2,284	.52
American Education, History of	57	51	46	42	—	9%	31%	11%	1%	—	375	.37
American Government	58	55	47	44	37	7%	36%	42%	11%	3%	869	.50
American History	59	53	46	43	40	13%	32%	37%	13%	5%	2,368	.54
American Literature	57	50	46	41	*	35%	33%	24%	8%	*	659	.48
Biology	61	53	49	47	43	16%	32%	33%	13%	6%	3,656	.48
Business Law, Introductory	63	57	51	44	38	9%	30%	37%	20%	4%	1,116	.67
Business Management, Introductory	61	52	47	42	38	9%	32%	45%	11%	3%	2,026	.52
Calculus, Introductory	58	51	48	44	43	18%	31%	34%	10%	6%	483	.43
Chemistry, General	65	53	48	46	44	9%	23%	38%	19%	11%	471	.52
College Algebra	62	55	50	45	42	9%	18%	28%	16%	7%	3,636	.59
College Algebra-Trigonometry	60	55	49	45	40	10%	21%	33%	20%	11%	3,734	.59
Computers and Data Processing	57	50	46	44	39	14%	27%	32%	10%	2%	3,121	.49
Computer Programming, Elementary–Fortran IV	58	53	48	43	40	28%	30%	27%	11%	4%	2,037	.54
Economics, Introductory	62	54	48	44	43	9%	23%	47%	17%	4%	636	.49
Educational Psychology	59	51	47	44	40	15%	36%	33%	6%	2%	2,075	.46
English Composition	62	55	48	43	40	8%	26%	44%	15%	6%	486	.57
English Literature	60	50	46	45	40	15%	35%	37%	11%	2%	1,023	.47
Geology	61	53	49	45	44	14%	33%	39%	12%	1%	301	.53
Human Growth and Development	56	52	47	41	41	18%	38%	37%	6%	1%	5,285	.43
Literature, Analysis and Interpretation of	61	55	49	41	40	7%	28%	48%	15%	2%	541	.54
Marketing, Introductory	61	53	48	43	36	8%	27%	38%	10%	2%	2,133	.51
Medical Technology												
Clinical Chemistry	57	51	47	41	—	19%	42%	33%	6%	—	2,148	.43
Hematology	56	51	46	40	—	22%	49%	24%	5%	—	2,230	.41
Immunohematology	56	50	47	42	—	23%	45%	26%	6%	—	2,083	.39
Microbiology	59	53	48	44	—	17%	35%	38%	10%	—	773	.53
Money and Banking	58	54	48	43	42	14%	26%	42%	14%	5%	924	.53
Psychology, General	65	55	47	41	35	10%	24%	55%	8%	2%	574	.66
Sociology, Introductory	67	54	46	41	38	11%	34%	39%	11%	5%	258	.61
Statistics	60	53	49	44	39	19%	29%	35%	14%	3%	2,316	.54
Tests and Measurements	64	52	46	42	42	14%	33%	38%	12%	3%	326	.60
Trigonometry	62	55	49	44	40	12%	20%	29%	16%	7%	2,577	.66
Western Civilization	63	56	50	42	42	7%	26%	40%	24%	3%	291	.60

*Only a few students received D and E grades. A score of 41 represents the average score of D and E students combined.